MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/ 2016

TCP 2651 CONCEPTS OF PROGRAMMING LANGUAGE /

TCP 2411 PROGRAMMING LANGUAGE CONCEPTS

(All sections / Groups)

2 MARCH 2016
9.00 am – 11.00 am
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 5 pages with **4 Questions** only.

2. Answer all **FOUR** out of the **FOUR** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please print all your answers in the answer booklet provided.

Question 1 (15 marks)

a) Select a programming domain that is suitable for processing a large number of floating point computations and another that is suitable for producing reports, decimal numbers and characters.

For answers given give at least 1 programming language that is suitable for the programming domains that you have selected.

[4 marks]

b) A company is about to design a new programming language for a scientific application and you are tasked to evaluate existing programming languages.

There are FOUR important evaluation approaches we usually use to evaluate a programming language. You need to list all these evaluation approaches and explain in detail at least 2 of the approaches.

[6 marks]

c) i) In your opinion, is there any difference(s) between *feature multiplicity* and *expressivity*? If yes, what is multiplicity, expressivity and their difference(s)?

[3 marks]

ii) Does feature expressivity influence readability? If yes, explain how feature expressivity influence readability?

[1 mark]

Continued...

Question 2 (15 marks)

a) i) Define the BNF rule for positive even number. [3 marks]

ii) Define the EBNF rule for positive odd number. [2 marks]

b) Show the derivation for the even number 114 using BNF in question 2(a). [4 marks]

c) Draw the parse tree using the BNF rules derivation in Question 2(b). [3 marks]

d) A programmer is designing a programming language and one of the tasks is to set the syntax for an identifier. This identifier should begin with a letter only, and optionally follow by other letter(s), digit(s) or underscore "_". And the last character of the identifier can only end with letter or digit only. The underscore should not be the last character in the identifier. Draw the syntax graph for the identifier.

[3 marks]

Continued ...

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Question 3 (15 marks)

a) Pointer variables are used in dynamic binding. What are the TWO applications of pointer variable? Give example for each application.

[4 Marks]

b) Explain *static type binding.*

Give ONE example of typed languages. [3 marks]

c) What is an enumeration type?

Write the enumeration type for IceCream that has chocolate, banana and strawberry flavors in C++.

[3 marks]

d) What are the two semantics of an arithmetic expression determined by?

[2 marks]

e) Array and record are similar but different. Write two main differences between the structure of an array and a record.

If I need to store 1000 students' name, address, subject taken, CGPA and contact number, which one should I use?

[3 marks]

Continued...

Question 4 (15 marks)

a) Rewrite the following code segment using a multiple selection statement in any **TWO** of the following languages:

if (v = 1) or (v = 2) or (v = 3) then j = v – 1
if (v = 5) then j = v + 1
if (v = 4) or (v = 6) then j = v * 2
Print an error message if none of the value is selected.

a. Fortran 95
b. Pascal
c. C++

Assume all variables are integer type.

[8 marks]

b) Differentiate the mechanisms term pass-by-value and pass-by-value-result. Give a programming language example for each parameter passing mechanisms.

[4 marks]

c) Consider the following program in C syntax: [3 marks]

```
void swap (int a, int b) {
     int temp;
     temp = a;
     a = b;
     b = temp;
}

void main() {
     int value = 1, list [5] = {1,2,4,6,9};
     swap (value, list[value] );
}
```

For each of the following parameter passing mechanisms, what are all the values of the variables `value` and `list` after the call to `swap`?

Trace the variables and list the values of all the variables using

i. Pass-by-value

ii. Pass-by-value-result

iii. Pass-by-reference

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